

REMARKS

We have added dependent claim 99. Claims 1, 4-8, 10-22, 98, and 99 are pending in this application.

The examiner rejected claims 1, 4-8, 10-22 and 98 under 35 U.S.C. §112, first paragraph as failing to comply with the written description. More specifically, the examiner objects to the reference to generation of a navigation “ranging” signal. We have addressed this by changing the claim to recite “navigation transmission signal.”

The examiner rejected claims 1, 4 and 13-22 under 35 U.S.C. §103(a) as unpatentable over U.S. 5,745,535 to Mori in view of U.S. 4,809,006 to Dar et al.

As we previously noted, Mori concerns a communication system, not a navigation system. One skilled in the art would appreciate that there are fundamental differences between communication systems and navigation systems to the extent that they are different technical fields. The skilled person in each case is not one and the same person. This becomes much more apparent when one considers the difference between communication spectra and navigation spectra and associated issues; and in this regard we refer the examiner to the discussion presented in our previous response dated December 28, 2010.

One would not be directed to digital communications system design to solve problems in satellite navigation system design as the techniques taught by the two disciplines are quite different. It is therefore again submitted that embodiments of the present invention are not obvious to one skilled in the Mori art relating to digital communication signals and systems. Such art is at best unhelpful to one skilled in the art of navigation signals and systems and at worst counter from a technical perspective to the aims of one skilled in the art of navigation signals and systems.

Mori is concerned with using QAM within a digital communications context. A method of generating a transmission signal using QAM is not a “method of generating a navigation transmission signal in a navigation system...”

The examiner acknowledges in relation to the pending claim that “Mori fails to teach that the modulated signal is a navigation ranging signal.” Since Mori does not relate to navigation signals and systems, it is also that Mori also fails to teach that the modulated signal is a “navigation transmission signal.”

The examiner asserts that it would be obvious to combine Dar with Mori but provides no indication of technical motivation for making such a combination. The technical reality is that Mori provides every possible disincentive to one skilled in the art for combining it with any other prior art document concerned with navigation signals and systems.

The examiner indicated that “Dar et al teaches a ground station 11 configured to modulate a carrier signal with a modulated subcarrier signal in modulator 27 to produce a ranging signal for transmission to a satellite 13 (note figs. 1 and 2, col. 2, lines 7-8, lines 44-47)”. We note that the examiner continues to assert that “[it] would have been obvious to one skilled in the art to have used the modulated signal as a ranging signal in the manner taught by Dar et al in order to provide the added control functions for satellite orbiting as taught by Dar et al see col. 1, lines 35-36”.

Turning to the first statement, namely, that “Dar et al teaches a ground station 11 configured to modulate a carrier signal with a modulated subcarrier signal in modulator 27 to produce a ranging signal for transmission to a satellite 13 (note figs. 1 and 2, col. 2, lines 7-8, lines 44-47)”, we have the following observations.

Figure 1 is entirely conventional and illustrates the known use of ranging tones by conventional Telemetry Tracking and Control (TT&C) stations. It can be appreciated from the description given in col. 1 of figure 1 that station 11 transmits command and ranging signals to satellite 13 (see col. 2, lines 6-8) and a second TT&C station 15 receives the commands and ranging tones (see col. 2, lines 9-11). The ranging tone is a sinusoidal wave having a frequency in the range of 5 Hz to 75 kHz. It is returned to the first station 11 by the second station 15 and used in a phase detector to determine the time taken for the round trip, corrected for delay in the satellite, which is useful for enabling the first station 11 to “determine the orbit range information for determining the

position of the satellite in orbit” (see col. 2, lines 14-19. The foregoing describes a conventional satellite system.

However, the invention that is the subject of Dar converts the ranging system into a digital communication system that has nothing to do with ranging. In essence, the system that is the subject of Dar has two (mutually exclusive) modes of operation; namely, a first, conventional, mode of operation as a conventional TT&C station and a second, unconventional, mode of operation as a communication system that establishes and uses “communication [links]” as can be seen from, for example, the references to “communications between the stations 11 and 15” (col. 2, lines 20-21), and “communication link” (col.2, line 23, and line 31). The mutually exclusive nature of the modes of operation is made more emphatic by the clear statement “The ranging mode is used infrequently and therefore, makes this communication link available at all time except during ranging operations” [emphasis added] (col. 2, lines 22-24).

The embodiment of Dar in a communication system mode is incompatible with embodiments of the present invention for all of the reasons that any prior art communications system is incompatible with navigation signals and systems. The observations made above in relation to Mori being technically incompatible with navigation signals and systems due to being communication signals and systems are equally applicable to Dar in the second mode of operation.

The examiner asserts that it would have been obvious to use “the modulated signal as a ranging signal”. The language “the modulated signal” is a reference back to the 16QAM signal of Mori. The examiner appears to be suggesting that it would have been obvious for one skilled in the art to replace the IF FM modulator 27 with the 16QAM modulator. Neither Dar nor Mori contain any hint that a technical advantage can be gained from making such a substitution. Neither Dar nor Mori contain any technical motivation for modifying the teaching of Dar to replace the IF FM modulator with the 16QAM modulator of Mori.

While it is clearly not admitted as being within the contemplation of the skilled man, even if one skilled in the art considered using the teaching of Mori in Dar, it is submitted that the invention as claimed in the present application would not result. It is submitted any use of the teaching of

Mori within Dar would involve replacing the subcarrier FM modulator 23 with the 16QAM modulator. However, as indicated above, the resulting system would still only be a communication system and not a navigation signal and system due to the second mode of operation of the TT&C stations to support communication links being mutually exclusive with their conventional ranging operations.

Therefore, while Dar is operating a ranging system, one skilled in the art appreciates that it is technically incompatible with a digital communication system such that one would not combine it with Mori or visa versa. While Dar is operating as a communication system it is as technically incompatible with navigation signals and systems as any other prior art that is concerned with communication systems, such as, Mori.

It is therefore submitted that claim 1, either before or after amendment, is not obvious in light of the combination of Mori and Dar.

For at least the reasons stated above, we believe that the claims are in condition for allowance and therefore ask the Examiner to allow them to issue.

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Respectfully submitted,

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